UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Technical Review Workgroup Lead Committee

An interoffice workgroup convened by Office of Superfund Remediation and Technology Innovation

MEMORANDUM

Date: February 24, 2017

Subject: TRW Lead Consultation: Review of the soil-dust ingestion rate and target blood lead level of concern in the Adult Lead Methodology for the Diamond Head Oil Superfund Site in Kearny, New Jersey

From: Michele Burgess, Todd Phillips, and Marc Stifelman
Co-Chairpersons of the Technical Review Workgroup Lead Committee

To: Brittany Hotzler, US EPA Region 2

This memorandum was prepared by EPA members of the Technical Review Workgroup (TRW) Lead Committee in response to your January 25, 2017 request for review of the selected soil remediation goal for lead, which has been identified as a contaminant of concern for the Diamond Head Oil Superfund Site in Kearny, New Jersey. The TRW Lead consultation is in accordance with the December 22, 2016 memorandum titled: "Updated Considerations for Lead in Soil cleanups" Specifically, Region 2 requested support from the TRW Lead Committee in adjusting the ingestion rate and target blood lead level in the Adult Lead Methodology.

The TRW Lead Committee reviewed the information provided January 25, 2017 and recommends the following:

- The TRW Lead Committee concurs with the recommended use of 5 ug/dL as the target blood lead level in the Adult Lead Model (ALM). The TRW Lead Committee recommends using a blood lead level of 5 µg/dL as the level of concern in the Integrated Exposure Uptake Biokinetic Model (IEUBK) and ALM. Current scientific information indicates that adverse health effects are evident with blood lead levels between 2 and 8 µg/dL. A target blood lead level of 5 ug/dL reflects

current scientific literature on lead toxicology and epidemiology that provides evidence that the adverse health effects of lead exposure do not have a threshold.

- The TRW Lead Committee concurs with the proposed soil-dust ingestion rate of 67 mg/day. It is an appropriate central tendency ingestion rate for the adult engaged in active outdoor activities where they may be exposed to a greater amount of soil relative to other outdoor activities. In addition to the literature provided by Region 2, the TRW Lead Committee suggests that data from more recent studies provide additional support of 67 mg/day as a central tendency exposure (CTE) value for adult soil-dust ingestion based on outdoor activities (see references).

- The TRW Lead Committee has conducted a recent analysis of the National Health and Nutrition Examination Survey (NHANES) 2009- 2014 background blood lead concentration (PbB_0) parameter and the geometric standard deviation (GSD_i) in the ALM. The PbB_0 represents the geometric mean (GM) blood lead concentration (PbB) (ug/dL) in U.S. women of child-bearing age. The GSD_i is a measure of the inter-individual variability in blood lead concentrations in a population exposed to the same non-residential environmental lead levels. The TRW Lead Committee will provide an update to the ALM[1] to incorporate the latest information from NHANES in the spreadsheet. The resulting PRG value using the latest information from NHANES (2009-2014) is 784 ppm incorporating the Region 2 proposed adjusted adult soil and dust ingestion rate and a target blood lead level of 5 µg/dL. See the adjusted parameters in red in the attachment.

- The TRW Lead Committee recommends including information on the lead levels found in surface soil (0-1"), which is considered to be the exposure interval for direct contact and at depths greater than 2 feet to understand residual lead levels left in soil after excavating soil down to 2 feet deep. The lead levels at depth should be factored into the risk assessment related to other anticipated direct contact exposure scenarios below 2 feet (e.g., laying cable)[2].

- After excavating down to 2 feet in area B, C and wet land areas in Area A and disposing it offsite, are you excavating more from these areas and spreading it in Area A for regrading? What levels of lead is expected in Area A after distributing the excavated lead contaminated soil and before placing a vegetative cover? The ALM should be conducted using the updated model information provided in the attachment and this information should be discussed in the risk assessment.

- The TRW Lead Committee recommends the Region consider using institutional controls that would exclude residential uses in the lead contaminated soils to achieve protective levels. The proposed approach did not include an evaluation for exposures such as frequent trespassing and other exposures of children that may not be protective under CERCLA. The

[1] The most recent update can be found at the following website: https://www.epa.gov/superfund/lead-superfund-sites-software-and-users-manuals#update

2 The proposed exposure scenario would not warrant further review by the TRW.

Region should evaluate these potential exposures for children and the response action should take appropriate measures to achieve protectiveness.

- The TRW Lead Committee recommends the use of the validated test method 1340: In Vitro Bioaccessibility assay for lead (IVBA)[3] to be used to inform site-specific bioavailability to adjust the default absorption factor in the Adult Lead Model to produce a site-specific preliminary remediation goal (PRG).

References

Doyle, J. R., J. M. Blais, R. D. Holmes and P. A. White (2012). "A soil ingestion pilot study of a population following a traditional lifestyle typical of rural or wilderness areas." The Science of the total environment 424: 110-120. http://www.ncbi.nlm.nih.gov/pubmed/22459882

Irvine, G., J. R. Doyle, P. A. White and J. M. Blais (2014). "Soil ingestion rate determination in a rural population of Alberta, Canada practicing a wilderness lifestyle." Science of The Total Environment 470–471(0): 138-146. http://www.sciencedirect.com/science/article/pii/S0048969713010759

3 https:www.epa.gov/hw-846/validated-test-method-1340-vitro-bioaccessibility-assay-lead-soil

Attachment 1

UPDATED INPUT VALUES AND RESULTS FOR THE ADULT LEAD METHODOLOGY (ALM)

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014	GSDi and PbBo from Analysis of NHANES 2007-2010	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal, 0.95}$	Target PbB in fetus	µg/dL	5	5	5	5
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	1.7	1.8	2.1
PbB_0	Baseline PbB	µg/dL	0.6	0.7	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.067	0.067	0.067	0.067
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219	219	219	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PRG in Soil for no more than 5% probability that fetal PbB exceeds target PbB		**ppm**	**784**	**840**	**577**	**72**